

Claims

- [c1] 1.A thermal detection device having a hot and a cold region, the device comprising:
a first thermocouple disposed across the hot and cold regions, the first thermocouple having a first terminal at the cold region and a defined polarity;
a second thermocouple disposed across the hot and cold regions, the second thermocouple having a second terminal at the cold region and a polarity opposite to the polarity of the first thermocouple;
a thermal absorber disposed at the hot region and in thermal communication with the first and second thermocouples;
a base header having a support surface and a non-support surface;
wherein a portion of the support surface opposes a portion of the cold region, and a portion of the non-support surface opposes a portion of the hot region.
- [c2] 2.The device of Claim 1, further comprising:
a diaphragm disposed between the support surface and the first and second thermocouples, such that a portion of the diaphragm opposes the non-support surface.

- [c3] 3.The device of Claim 1, wherein:
the first and second thermocouples are responsive to thermal radiation absorbed at the thermal absorber to generate a combined electrical signal at the first and second terminals.
- [c4] 4.The device of Claim 3, wherein:
the combined electrical signal for the device having a distance between the support surface and the non-support surface equal to about 0.8 millimeters is equal to or greater than about 1.65 times the combined electrical signal for the device having a distance between the support surface and the non-support surface equal to about zero millimeters.
- [c5] 5.The device of Claim 1, wherein the thermal absorber is a black body.
- [c6] 6.The device of Claim 1, wherein the non-support surface comprises a cavity formed at the support surface.
- [c7] 7.The device of Claim 6, wherein the cavity comprises a side channel.
- [c8] 8.The device of Claim 1, wherein the support surface comprises a spacer.
- [c9] 9.The device of Claim 1, wherein the distance between

the support surface and the non-support surface is equal to or greater than about 0.1 millimeter and equal to or less than about 10 millimeter.

[c10] 10.The device of Claim 9, wherein the distance between the support surface and the non-support surface is about 1 millimeter.

[c11] 11.The device of Claim 1, further comprising:
a cap disposed to house the first and second thermocouples between the cap and the base header, the cap and base header defining an internal volume, the cap having a window proximate the hot region for transmitting thermal radiation therethrough.

[c12] 12.The device of Claim 11, further comprising:
a gas within the internal volume, the gas being in fluid communication with the non-support surface.

[c13] 13.An apparatus for infrared radiation detection, the apparatus comprising:
an infrared radiation sensor element comprising an infrared radiation receptor, and first and second terminals, wherein the receptor is disposed at a hot region, each terminal is disposed at a cold region, and each terminal is in signal communication with the receptor; and
a base header having a support surface for supporting

the infrared radiation sensor element and a non-support surface displaced from the support surface;
wherein a heat transfer between the cold region and the support surface comprises thermal conduction, and a heat transfer between the hot region and the non-support surface comprises thermal convection.

[c14] 14.The apparatus of Claim 13, wherein the infrared radiation sensor element further comprises:
a first and a second thermocouple each disposed across the hot and cold regions, the first and second thermocouples having opposite polarities and being in thermal communication with the infrared radiation receptor, the first thermocouple being in signal communication with the first terminal, the second thermocouple being in signal communication with the second terminal, wherein in response to thermal radiation received at the receptor an additive electrical signal is presented at the first and second terminals.

[c15] 15.The apparatus of Claim 13, wherein the infrared radiation sensor element further comprises a diaphragm disposed between the support surface and the first and second thermocouples, the diaphragm having a portion opposing the non-support surface.

[c16] 16.The apparatus of Claim 13, wherein the non-support

surface is displaced from the support surface by a distance equal to or greater than about 0.1 millimeter and equal to or less than about 10 millimeter.

[c17] 17.The apparatus of Claim 16, wherein the non-support surface is displaced from the support surface by about 1 millimeter.

[c18] 18.The apparatus of Claim 13, further comprising a cap disposed to house the infrared radiation sensor element between the cap and the base header, the cap and base header defining an internal volume, the cap having a window proximate the hot region for transmitting thermal radiation therethrough.

[c19] 19.The apparatus of Claim 18, further comprising a gas within the internal volume, the gas being in fluid communication with the non-support surface.

[c20] 20.An apparatus for infrared radiation detection, the apparatus comprising:
an infrared radiation sensor element comprising a hot region and a cold region; and
a base header having a support surface for supporting the infrared radiation sensor element and a non-support surface displaced from the support surface;
wherein a portion of the infrared radiation sensor ele-

ment at the cold region opposes a portion of the support surface, and a portion of the infrared radiation sensor element at the hot region opposes a portion of the non-support surface.